July 16, 1964

RESOLUTION SCREEN

1. is moving to on July 25. is about 20 miles east has taken over as Engineering Department Manager and now reports to him. This is the position formerly held by who left in May and went to was formerly Northern Region Manager and was stationed in Washington, D.C. You may have met him. stated he is cleared. will take over in

2. Work on the organic phosphors for the high-resolution screen is going well, however, the inorganic phosphors do not seem to be performing as well as hoped. The inorganics being tested are (1) zinc sulphide:copper, (2) zinc sulphide, and (3) zinc cadmium sulphide:copper. These have proved to be much less bright than the organics and the Lab is considering discontinuing the inorganic phosphor work.

With the organic phosphors, however, there appears to be a possibility of getting good brightness and their attention has now turned to color requirements. Anthracene emits a deep blue light, Fluorene emits a blue-white light but only in crystal form. Umbelliferone emits a blue-white light but coating is a problem. Rubrene emits a yellow-orange light but is not colorless to room light.

They are also doing some work with certain dies, Calcofluor RW, Calcozine BX, Fluorol 7GA and S-1G4 and with mixtures. The mixtures give greater brightness and will probably provide additional control of color.

3. The desired color of the emitted light for best viewing is an open question of immediate concern. Although green is the commonly accepted color of highest acuity, has some evidence that seems to indicate that blue might be better for this application.

discussed the question with [redacted] who is an experimental psychologist at UCLA. [redacted] is doing research in psychological aspects of color at UCLA. In discussion with [redacted] and me, [redacted] admitted that the experimental evidence for selecting green was not directly applicable to this situation and, therefore, inconclusive. [redacted] indicated that the only way to answer the question would be to run some tests. [redacted] agreed to participate on a minimum time basis if a test program were desired. [redacted] has prepared a proposal for such a program.

The question is urgent to the direction of the phosphor screen work. It is also urgent because [redacted] will be essentially unavailable after September 15 when school starts. I consider it extremely important to have an experienced psychologist direct the tests because in this work minor variations in procedure can easily result in measuring the wrong thing. If it is decided to run the tests, I urge you to find some way to start them by August 15. Timeliness is important.

4. Projector and Optics. [redacted] has received the Zeiss Ikon projector Xenosol III to be used for screen illumination. The 2500-watt mercury vapor lamp is being procured separately. [redacted] has a lens design with about a 10-ft lens to screen distance, which is an improvement over the previous mirror type which had about a 20-ft lens to screen distance. It is corrected for UV and green, and has a quartz correcting plate almost at the film plane.

5. Light Table Illumination. Some time ago I suggested to [redacted] that the UV excited phosphor might be applicable to a light table to provide added brightness for microscope viewing. On June 24, 1964, he submitted the two brief one-page discussions enclosed. Is there any interest in further discussion of this possibility?

[redacted]

Encs.

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Gentlemen:

In our letter of this date we have described a possible improvement in light table technology by suggesting the application of a fluorescent surface for the table. Although such a table may provide sufficient illumination by itself it may prove desirable to have the capability for increasing the brightness of the table surface directly beneath the microscope objective.

A light source which can be incorporated as part of the microscope suggests itself. With this device additional excitation of the table phosphor may be achieved by condensing both the 2537Å and 3654Å mercury vapor lines directly through the film and table top to excite the phosphor. Both U.V. radiations are invisible to the eye thereby minimizing reflections from the film surface.

what about eye damage when using microscope?

Compact light sources are available which can be formed to fit around the microscope objective. A circular lamp with an appropriate mirror system suggests itself. If the fluorescent light table proves applicable we feel that the microscope light may also prove a useful tool. A proposed program would be to first develop the table and test the microscope lamp in breadboard to prove feasibility at minimum cost before designing a prototype.

Sincerely,

STAT

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WDS:jsf

24 June 1964

Gentlemen:

During development of the High Resolution Fluorescent Screen several additional applications for fluorescent surfaces have suggested themselves. During the examination of photograph negatives light tables are used which are customarily illuminated by fluorescent lamps placed beneath a translucent surface. One of the reasons for intense illumination is to provide scattered light at the surface of the table at high levels. During microscopic examination of film the remote position of the light source creates some difficulty in that some unevenness of illumination is observed primarily because the filling of the numerical aperture of the microscope with light varies from one position to the next. When the microscope is aligned so that direct rays from the illuminating source are intercepted, a hot spot is encountered.

We believe that these tables could be improved to a great extent by providing the luminous surface directly on the underside of the table top. A phosphor coating flooded with Ultra Violet light is suggested which may provide the required light intensity and at the same time be a uniform emitter over a full spherical angle for incremental areas smaller than a micron size. This phosphor would very likely not be transparent since it is desirable to hide the Ultra Violet source. Thus, with the illuminating source being close to the film and possessing Lambertian characteristics the microscope should see an evenly illuminated source and its position or angle with respect to the table is no longer critical. The full aperture of the microscope would be filled with light -- an impossibility with present light tables.

The radiant energy may be obtained from fluorescent tubes designed to radiate 2537A. All harmful radiation is either absorbed by the phosphor or shielded from the operator.

It is our hope that development of such a light table would be applicable to your needs and that you would consider [redacted] STAT
STAT [redacted] as a team to test the feasibility and develop this item.

Sincerely,

[redacted] STAT

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